Molecular Characterization and Functional Exploration of Hemogenic Endothelium

Grant Award Details

Molecular Characterization and Functional Exploration of Hemogenic Endothelium

Grant Type: Basic Biology I

Grant Number: RB1-01328

Project Objective: The goal of this project is to identify transcription factors that drive hemogenic, as opposed to non-hemogenic, endothelium fate in the developing mouse embryo, and to apply that knowledge toward inducing hemogenic ability in human endothelial cells.

Investigator:

Name:	Luisa Iruela-Arispe
Institution:	University of California, Los Angeles
Type:	PI

Disease Focus: Blood Disorders

Human Stem Cell Use: Directly Reprogrammed Cell, Embryonic Stem Cell

Award Value: $1,371,477

Status: Closed

Progress Reports

Reporting Period: Year 1

View Report

Reporting Period: Year 2

View Report

Reporting Period: Year 3

View Report

Grant Application Details

Application Title: Molecular Characterization and Functional Exploration of Hemogenic Endothelium

Public Abstract:

Hematopoietic cells are responsible for generating all cell types present in the blood and therefore critical for the provision of oxygen and nutrients to all the tissues in the body. Blood cells are also required for defense against microorganisms and even for the recognition and elimination of tumor cells. Because blood cells have a relatively short life-span, our bone marrow is constantly producing new cells from hematopoietic progenitors and responding to the relative needs to our tissues and organs. Blood cancers (leukemias), as well as other disorders or treatments that affect the production of blood cells (such as chemotherapy or radiation therapy) can significantly jeopardized health. Transfusions are done to aid the replacement of blood cell loss, but pathogens and immunological compatibility are significant and frequent roadblocks.

In this grant application, we present experiments to further understand how another cell in the body, the endothelium, located in the inside wall of all our vessels, can be coax to produce large numbers of hematopoietic cells with indistinguishable immunological properties from those in the bone marrow of each individual. Endothelial cells are easily obtained from skin biopsies or from umbilical cord and they can be expanded in Petri dishes. The experiments outlined were designed to further understand how endothelial cells are capable of generating blood cells during development. This information will be used to entice endothelial cells to generate hematopoietic cell progenitors in vitro.

The impact of this research is broad because of its clinical applicability and because of its potential to decipher the mechanisms used by endothelial cells to undergo normal reprogramming and generate undifferentiated progenitor cells of a distinct lineage. Adult cell reprogramming is one of the fundamental premises of stem cell research and thus, highly relevant to the main goals identified by the CIRM program.

Statement of Benefit to California:

Technology developed from this grant application has the potential to be translated directly to clinical settings. This technology is extremely likely to engender interest by the big pharma which can potentially license the information from the University of California or purchase the patent for the invention / technology. Naturally this will bring revenues and recognition to the state of California. Furthermore, California will remain ahead of the technological wave that takes advantage of stem cell technology and implements innovative medical treatments in the entire country and abroad.

In addition, the execution of this proposal will immediately provide employment to four individuals, two of these trainees in stem cell research. Indirectly, the grant will also support salaries of employees at the university associated with research, animal care and administration.